



Universal **natural milker**

GENERAL **Instruction Book**

for operating
All Types UNIVERSAL MILKER UNITS
ELECTRIC VACUUM SYSTEM
TAYLOR VACUUM ENGINES
UNIVERSAL WASHER-STERILIZER
STRAUSS DAIRY WATER HEATER
STRAUSS STEAM STERILIZER

[10th Edition] MARCH 20th, 1944

THE UNIVERSAL MILKING MACHINE CO.

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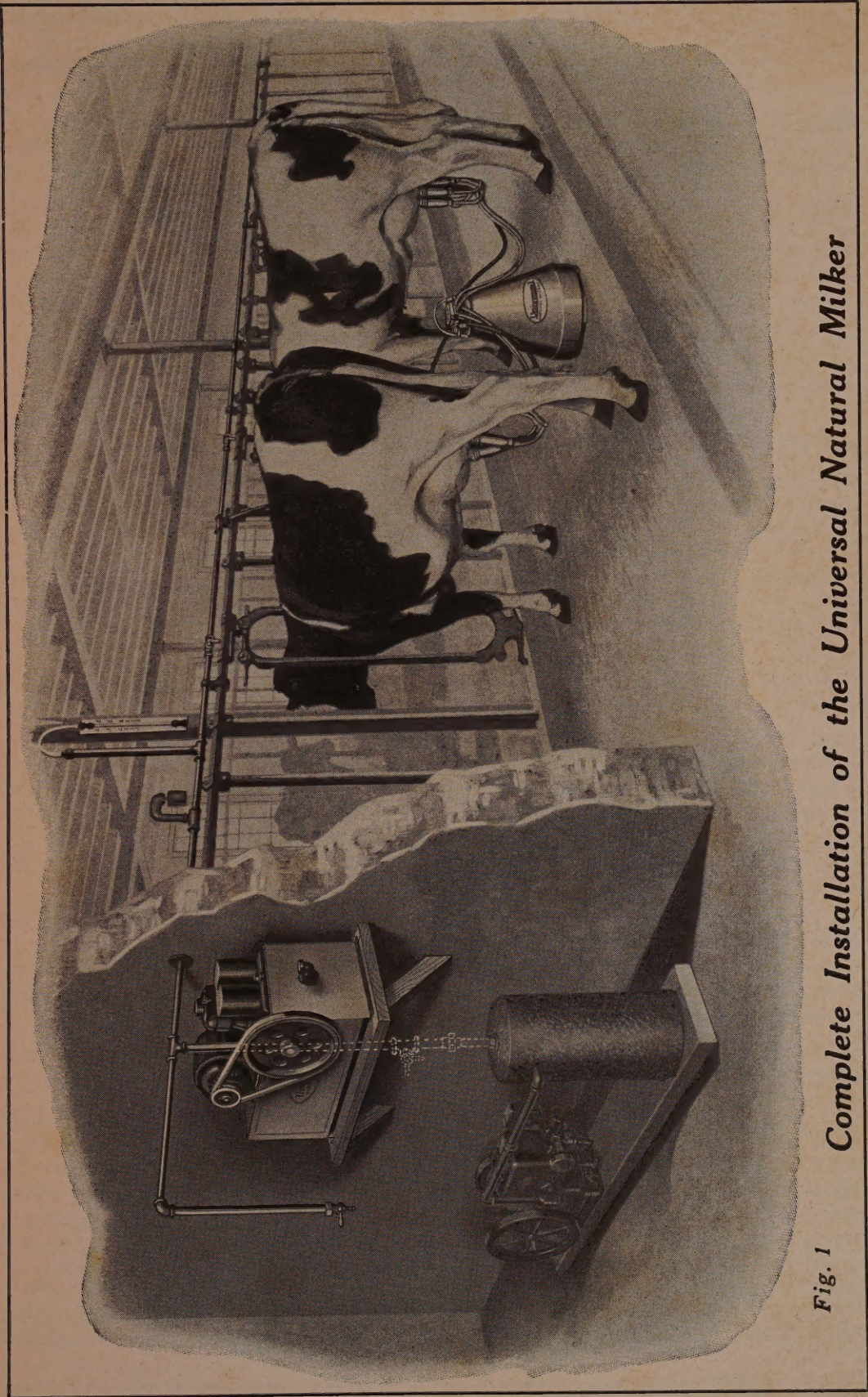


Fig. 1

Complete Installation of the Universal Natural Milker

THIS is a GENERAL instruction book covering all general points of installation, operation and care of all types or models of milking units, vacuum systems, etc.

There are also available supplementary instructions for each different model or type of Universal Milker. One of these is packed with each new milker unit when shipped. Additional copies are available on request by giving serial number of the equipment for which it is desired.

INSTALLATION OF MILKER

LOCATION OF VACUUM SYSTEM

The first consideration in making installation of the UNIVERSAL milking machine is the location of the vacuum pump, which should be located as close to the stanchion as possible on substantial foundation or shelf that is level crosswise and lengthwise as shown by a spirit level. It should be as convenient as possible for starting, stopping, oiling and inspecting. The vacuum outfit may be installed at any reasonable distance from the stanchion row, but the usual practice is to not locate it in the milk house.

Where the pipe line is exposed to freezing temperatures it is advisable to use $1\frac{1}{4}$ " pipe, to avoid any possibility of freezing from condensation or when water is drawn through the line for cleaning.

Pipe of $1\frac{1}{4}$ " diameter also prevents frost formation on the inside which eventually might result in stoppage. Galvanized pipe of 1" should be used on all installations. It is advisable to have as few turns or bends as possible in the line. All cut pipe ends should be thoroughly reamed and joints should be treated with white lead before the pipe is screwed together so as to assure the line being vacuum tight and at the same time prevent the threads from rusting together.

At some convenient place in the pipeline between the vacuum pump and relief valve the pipe should be left open, or a section about $2\frac{1}{2}$ inches cut out and a rubber hose slipped over the two pipe ends. This will prevent any short circuit through the pipe line in the event of any electrical trouble that might develop in the motor or electrical wiring.

RELIEF VALVE

The relief valve and mercury gauge must be located between the vacuum tank and the first stall cock, with the relief valve between the tank and the mercury gauge. A 1" tee is furnished with each vacuum system. Screw the relief valve into the 1" opening of the tee for use in installing the relief valve in the line. The relief valve should be in an exact vertical position so that the weight valve will seat properly. The purpose of the relief valve is to maintain accurately, a constant vacuum in the pipe line, the amount of which is regulated by adding or removing small disc weights until the desired number of inches is indicated by the mercury in the glass tube. Universal NATURAL Milking Units milk the cows with regulated low vacuum.

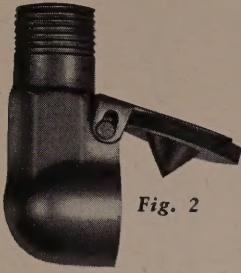


Fig. 2

UNIVERSAL AUTOMATIC DRAIN VALVE

Warm air passing through cold metal pipes sometimes causes any moisture in the air to condense and accumulate in the pipe line. In cold weather this may freeze and in time completely close the pipe line, causing inconvenience. The Universal moisture drain valve, Fig. 2, when installed in the vacuum line, permits any accumulation of moisture to automatically drain from the line. It is kept

closed by vacuum when the milker is in operation. When the vacuum in the system has been released, any moisture in the line will pass through this valve and drop to the floor, thus insuring the pipe line being kept dry at all times. It is recommended they be installed with the milker outfit, using as many as may be needed to drain each section of the pipe line.

STALL COCKS

The fittings for stall cocks are $1 \times 1 \times \frac{1}{2}$ ". In placing stall cock fittings, one stall cock should be placed between or over each stanchion or cow. The angle stall cock should always be used, also the Universal automatic drain valve.

MERCURY GAUGE

The mercury gauge Fig. 5 should be located near the relief valve Fig. 5A and always between the relief valve and the first stanchion cock. Care should be exercised in unpacking the mercury to avoid breaking the bottle containing the mercury, or the glass tube of the gauge. The gauge should be fastened in a vertical position on a wall, or a post, with the top of the gauge at least 1 foot above the pipe line, higher if conditions will permit. A $\frac{3}{4}$ " pipe should be extended from the pipe line to the height of the top of the gauge. A special reducing fitting is furnished for the $\frac{3}{4}$ " pipe and to which is attached the rubber tubing for making the connection between this fitting on the pipe line and the mercury gauge. The small spring clip, or staple, at the bottom of the gauge should be removed and the bottle of mercury placed in position with the end of the glass tube raising $\frac{1}{16}$ " from the inside of the bottom of the mercury container or bottle. The spring clip or staple, should be replaced for holding the bottle of mercury in position. The felt washer on the glass tube should be pushed down to the top of the mercury bottle. This is for keeping dust and dirt from entering the mercury container. Should there be more or less than $\frac{1}{16}$ " clearance between the glass tube and the bottom of the mercury container, loosen the four screws on the top guard of the glass tube and adjust this tube up or down, as the

occasion may require, to obtain the proper clearance. With the vacuum system in operation the mercury in the glass tube should register between 10 and 12 inches. Variation in the registration can be affected by adding or removing the small disc weights on the relief valve. Greater vacuum than 12 inches should never be used with any Universal Milker.

For the exact amount of vacuum to use, refer to special instruction book for the particular model milker unit being used.

NEVER OPERATE MILKER WITHOUT GAUGE

A milker should never be operated without mercury in the vacuum gauge. No milking machine should ever be operated without an accurate vacuum gauge. If mercury is accidentally lost it may be purchased from any local Universal dealer or from any drug store. There should be at least 1" of mercury in the bottom of the bottle when the bottle is in position in the gauge.

Fig. 5

ASSEMBLING MILKER UNIT

Universal NATURAL Milker Units are shipped completely assembled except the long milk tube, duplex air tubes and the long vacuum hose, which are not attached to the pulsator. To attach these, hold the teat cups and milk claw in operating position, wet the ends of these tubes by dipping them in water and then slip the end of the long tube on the nipple of the milk spigot. The ends of the duplex air tubes are similarly placed on the air relief tubes on the pulsator. The vacuum hose is equipped with replaceable rubber ends, or extensions, which should be replaced when they become worn or stretched.

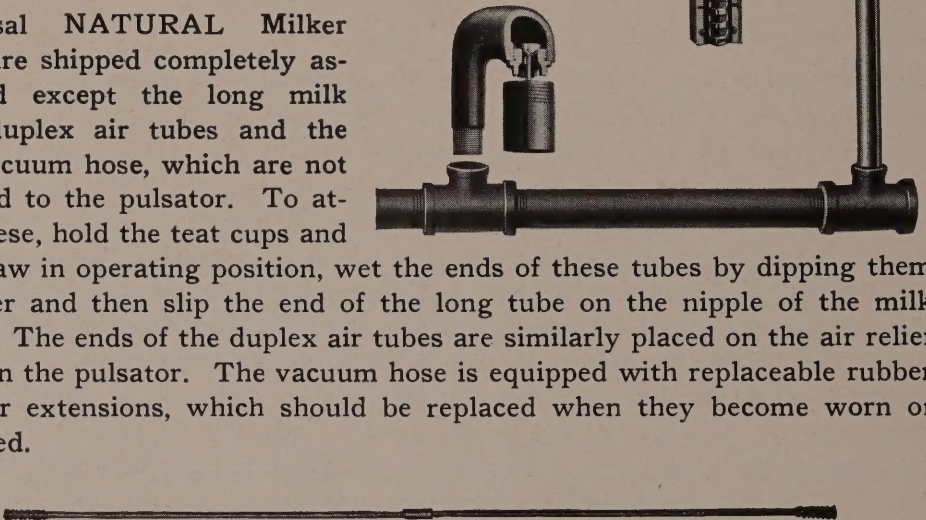
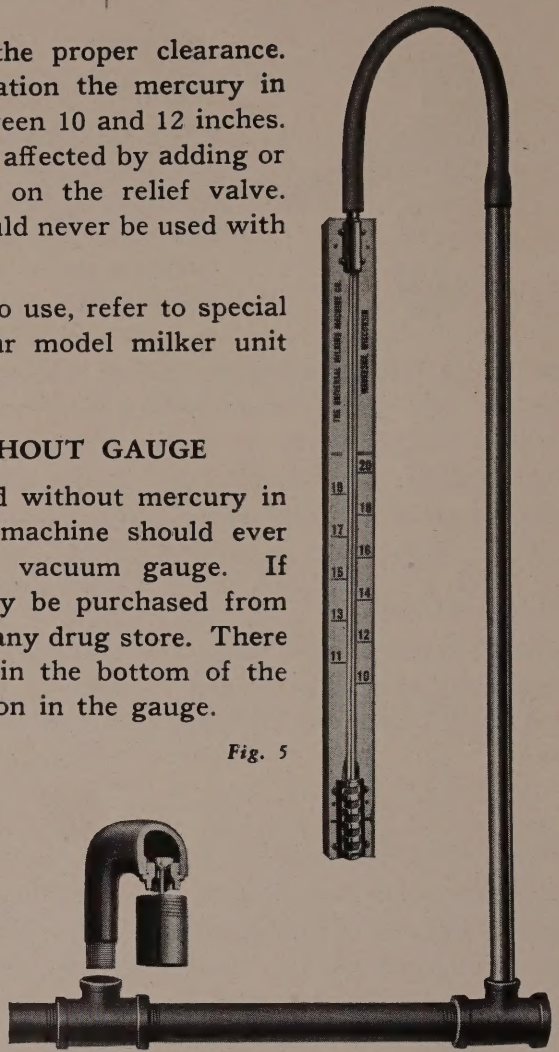


Fig. 7

FREE CLEANING ROD

Attached to the handle of every UNIVERSAL pail lid or can lid, is an envelope marked "Important—Contents Worth \$1.00", which contains a self addressed stamped post-card. If this post-card is returned promptly with the

user's name and post office address printed on it, and the serial number of the pulsator, which is stamped on the side of each pulsator, a cleaning rod (Fig. 7) for all standard milker units, or a pail brush for short tube milker units will be sent all charges paid, as soon as this card is received by the Company.

TESTING PIPE LINE

When the installation has been completed, close all stall cocks, start the vacuum pump, examine every part of the line for any hissing noises. If any are heard except from the relief valve, it is an indication that there is a leak in the line and this should be corrected before attempting to use the milker.

TESTING MILKER UNIT

Start the vacuum pump; attach the vacuum hose to stall cock; and turn stall cock to "open" position. The pulsator should begin to operate. If any hissing noises are heard examine for leaks, such as pail lid not setting squarely on pail, milk spigot open, etc.

MILK CLAWS

All UNIVERSAL milk claws are so designed that the vacuum is automatically shut off when the claw is held in a level position with the milk tube connections pointing up and the teat cups hanging down in their normal position. This prevents air passing through the cups when the vacuum is on and is what is known as the automatic "shut off".

New operators should always practice holding the claw in the correct position before attempting to attach cups to the cow. Turn on the vacuum by moving the milk spigot to "open" position, then lift the teat cup as though it were to be put on the cow. By keeping a slight kink in the short milk tube (see Figure 21, Page 8, and article entitled "Attaching Teat Cups", Page 7), the cup will not admit air, which, of course, will prevent the loss of vacuum and eliminate any hissing sound that might frighten a nervous cow that has never been milked by machine. A new operator could not expect to become expert at handling the machine the first week. This is accomplished only by time, practice, and study of the machine and cow. A constant study of both are recommended as the machine is unable to think for itself and the cow cannot express her feelings. Therefore, the more intelligent application shown on the part of the operator the more successful will be the milking operation.

PREPARING COWS

Before attaching the machine for milking, the udder and teats should be brushed free of dirt, straw, or any foreign matter that might get into the



Fig. 18

milk. The best practice is to wash with warm water and dry the udder and teats before milking. See Fig. 18, above. This removes all foreign material that might otherwise get into the milk and result in an unfavorable sediment test or cause unnecessarily high bacteria counts. If a good disinfectant is added to the water used for washing teats and udders the work will be even more effective.

FORESTRIPPING

Two or three squirts of milk should be milked into a small pail or vessel before the milker is attached. This is termed "forestripping" and is recommended first, because it breaks **nature's** seal at the end of the teat and in removing the milk accumulated in the teat it carries out the bacteria that usually total great numbers in the milk contained in the end of the teat only. It also enables the operator to **detect** any abnormal condition that may be prevalent in any quarter of the udder.

WATCHING THE MILK FLOW

Some types of Universal NATURAL Milker Unit are equipped with an observation glass located in the top of the milk spigot (Fig. 20, Page 8), or

in the Milk Claw. As soon as the milk starts it can be seen through the observation glass. As soon as the milk flow stops the cups should be removed.

Some types do not have any observation glasses. When these are used the operator will soon become accustomed to judging by observation of the udder when the milking is finished.

TIME REQUIRED FOR MILKING

The time required to milk any individual cow, or any particular herd, depends on several factors. First: The amount of milk to be obtained. Second: Whether the cows are fast or slow milkers. Third: The application of the operator and changing the milkers from one cow to another. Experience has proved that the best method of teaching cows to milk by machine is to leave the machine on each cow for a period of 2 to 4 minutes, after which the machine is removed regardless of whether the cow has responded completely or not. Then the cow should be stripped **quickly** and **immediately** after the machine has been removed. This will teach the cow to respond quickly to the machine. One of the principle things to be desired in the use of a milking machine, is, to save time and labor. The less time consumed in milking, the better the cows will respond. (See also **milking by machine**, Page 8 and **stripping**, Page 9.) A new milker unit should be sterilized and cleaned before being used. After the machine has been assembled, drop the teat cups in a pail of clean cold water. Use crank handle teat cup brush, which comes with each unit, to brush inside of teat cups, attach vacuum hose to stall cock and draw a pail of cold clean water through each unit. Then sterilize by drawing $1\frac{1}{2}$ gallons of **boiling** hot water through each single unit or from 2 to 3 gallons for each double unit. Remove the water from the pail, and the unit is ready for milking.

MILKING THREE TEATED COWS

When a 3-teated cow is being milked, the position of the idle cup in the teat-cup assembly is shown in Fig. 22, Page 8. This position not only prevents air from entering the cup, but also keeps the cup out of the dirt.

ATTACHING TEAT CUPS

Hold the teat cup assembly with one hand as indicated by Fig. 21, Page 8. Turn the milk spigot, Fig. 20, Page 8, in the lid to "open" position and apply the teat cups to cow.

MILKING BY MACHINE

The first time the cow is milked by machine, the machine should be left on only while the milk is flowing freely, which usually is from 2 to 4 minutes. Just the moment the full flow lessens or stops, the machine should be removed and the remaining milk taken by hand. No attention should be paid to the amount of strippings received after the machine for the first few milkings. The object is to accustom the cow gradually to the machine-way of milking, and teaching her to respond.

The operator should apply and remove the teat cups just as gently as possible so as not to frighten the cow, especially if she is of a nervous disposition. It should always be taken into consideration that the cow is a living animal and if of a nervous temperament she will require patient handling. Whether the cow likes or dislikes the milking machine depends greatly on the way she is handled during the first few milkings.

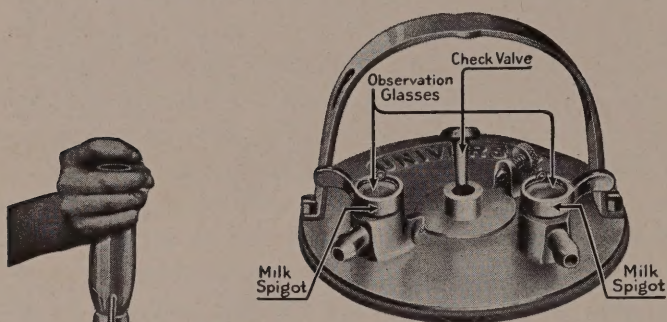


Fig. 20

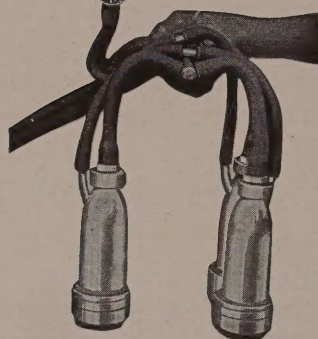


Fig. 21

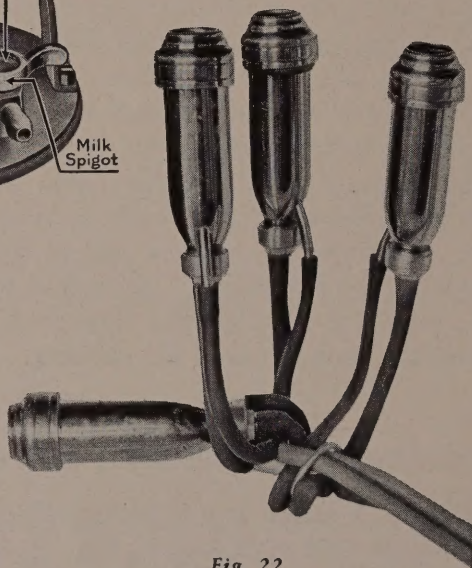


Fig. 22

REMOVING CUPS

Shut off the vacuum by turning the spigot in the lid to the "closed" position. As soon as cups loosen from udder, turn spigot quickly to open for just a second. This will admit air and clear cups and tubes of all milk left in them. The cups can then be easily removed. The entire teat-cup assembly with open ends down is hung from the pail lid handle.

REMOVING MILK FROM PAIL

To remove pail lid and entire assembly from pail, turn one milk spigot Fig. 20 to "open" position. Air quickly displaces the vacuum in the pail, permitting the entire assembly to be lifted from the pail and the milk emptied into another container and the same pail used for the next cow. If an extra pail is used the assembly can be placed on the extra pail. The milk can then be emptied while the milker is milking the next cow.

STRIPPING

As soon as the milker has been removed from the cow she should be **stripped immediately and quickly** or be tested to see that she has been milked perfectly dry. **This is very important.** The mechanical milker is only a machine and should any abnormal condition arise such as the cow becoming frightened it may cause her to hold the milk. Also, cows that have been milked by hand do not always have even quarters, often having one quarter that will not milk out as quickly as the others, in which event either massaging the udder before removing the cups, or milking the remaining milk by hand, is very necessary. Stripping, or trying the cow by hand, after the cups have been removed, keeps the operator familiar with the condition of the udder and teats. In stripping, or trying the cow by hand, do not use the thumb and forefinger any more than is absolutely necessary as this stripping, especially if prolonged, frequently results in the cow forming the habit of responding slowly and eventually she will become what is known as a "dribbler". Always milk in the regular way and **not** by thumb and forefinger.

MILKING HABITS OF COWS

The milking habits of cows may be controlled entirely by the hand milker, or milking machine operator. Young cows that have not been milked by hand invariably respond best to machine milking. If the operator is quick in his movements and is careful to always remove the machine the moment the full flow of milk lessens, the cow will give her production quickly and will continue to do so as long as the operator continues the practice. Should an operator become slow or careless in not removing the machine the moment the cow is finished milking, there is a possibility of the cow forming the slow milking habit, or of even holding her milk entirely.

This same result can be obtained by a hand milker who is a very slow milker. When a cow has formed the slow milking habit, either by hand or by machine, it is a tedious task to break her of it. Never try to force cows to milk to a machine. Leave the machine on only while the milk flows freely. No harm results when a UNIVERSAL Milking Machine operating on 12

inches or less of vacuum is left on the cow for long periods of time, other than slow milking. Teaching the cow to milk out quickly is recommended for economic reasons, namely, the saving of time, power, etc., and not because of any fear of physical injury that may result by leaving the milker on the cow for prolonged periods.

EFFECTS OF LOW VACUUM

Practical experience of hundreds of dairy herds covering from ten to twenty or more years of continuous daily use of a milking machine using 12 inches or less of vacuum has proven conclusively that no ill effects are ever encountered from the use of low vacuum and that injury to the cows from this source is unknown, while on the other hand, the higher the vacuum above 12 inches as shown by the mercury gauge, the more certain and more quickly trouble is encountered, the practice of which inevitably leads to first, a lessening of milk production, secondly, shortening of the lactation period, third, permanent physical damage to teats and udders. Always use **low vacuum** as recommended for each type Universal Milker Unit

STICKY RUBBER — CAUSES AND PREVENTION

If the instructions under care of inflations and liners (Page 17) are followed, practically no trouble will be experienced with inflations. If, at any time, trouble is experienced with any part of the rubber on the machine (especially inflations) becoming sticky, or having the appearance of starting to dissolve, it is usually due to improper cleaning. The butter fat in the milk will adhere to rubber very readily and cannot be removed except by flushing the machine with boiling water or by removing the rubber and brushing it in water to which has been added a good cleaning compound. Either of these methods will dissolve and carry out all butter fat accumulation. If the butter fat is allowed to remain on the rubber the vacuum in the tubes has a tendency to cause the butter fat to penetrate more readily, and the rubber, which is a vegetable compound, will soon dissolve and become sticky.

IMPORTANCE OF STERILIZATION

Two things are absolutely necessary to produce clean low bacteria count milk with a milking machine. **FIRST, THE MILKING MACHINE MUST BE CLEAN. SECOND, THE MILKING MACHINE MUST BE STERILE.** Washing and brushing a milking machine is not enough. In fact, the job is only half done. **Sterilization** is the other and the very important half. Cleaning and sterilizing is a simple task if the methods outlined on Pages 11 to 13 inclusive are followed. Years of experimentation in both the field and laboratory have definitely established that no difficulty is experienced in

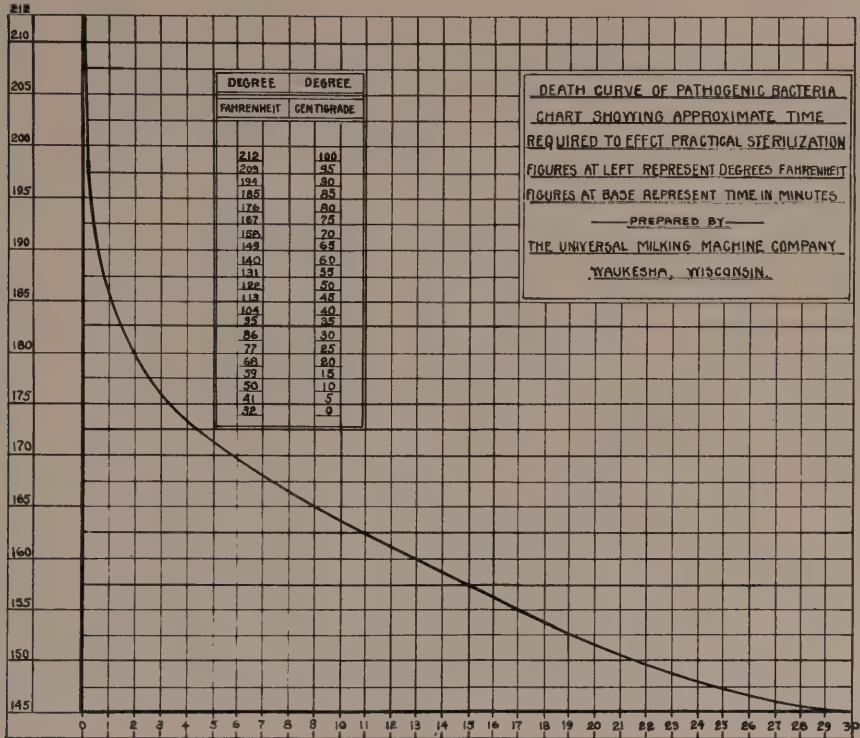


Fig. 25

keeping a milking machine clean and sterile if boiling hot water is used. The quantity of hot water necessary depends on the temperature. A brief study of the chart above reveals that 212 degree water kills all harmful bacteria instantly—145 degree water takes thirty minutes. Therefore, the hotter the water the better job it will do in the shortest time.

FLUSHING WITH COLD WATER

Immediately after the milker unit has been taken from the last cow and the milk emptied from the milker pail, the milker head should be placed back on the milker pail. Place the teat cups of the machine in a pail of clean cold water. Fig. 26, Page 12. Turn on the vacuum and suck not less than 14 quarts of cold water through each milker unit. This removes all milk that has come in contact with the metal and rubber parts. **NEVER SET A MILKER UNIT DOWN AND LET THE MILK DRY ON IT.** Dried milk can be removed only by thorough scrubbing, thus making not only unnecessary work, but also taking chances of further contamination. Empty cold water from the milker pail then use boiling hot water as follows:

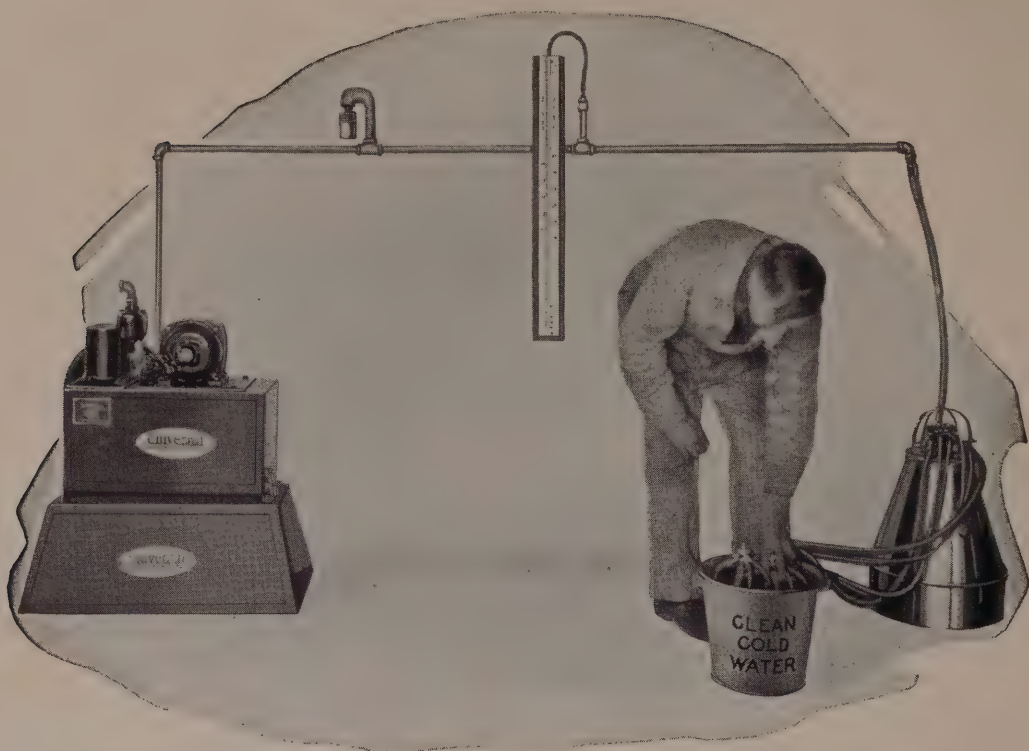


Fig. 26

BOILING HOT WATER

For the sterilizing of milking machines, there is one outstanding successful and reliable method, which is known as the boiling hot water method. It is employed as follows:

Immediately after the milking machine has been flushed with cold water, suck at least 14 quarts of **boiling** hot water through each unit. Luke-warm, or what is known as ordinary hot water, will not be effective and may even do more harm than good. For effective results, the water must be **boiling**, or at least 195 degrees Fahrenheit. This boiling water does double duty; first, by dissolving and carrying out the accumulation of butter fat and other ingredients in the milk that may have stuck in the tubes and not have been removed by the cold water; and secondly, it very effectively kills harmful bacteria and thereby does a most effective job of sterilizing the milker tubes and all other parts with which it comes in contact. Thoroughly wash and sterilize the milker pail and pail cover as you would any metal milk utensil. The milker should next be placed on a rack in a cool, dry place, (away from all dirt, dust, flies, etc., or covered with a suitable cloth), so that any moisture in the tubes can drain out quickly and completely. The milker may be left in this place until ready for the next milking. Immediately

before the machine is used again, it should be flushed out with a pail of boiling hot water. This is a double precaution in that it again sterilizes the milker, killing any bacteria that may have developed in the machine between the milking periods. It is recommended, however, that in using this method for cleansing the rubber tubing, at least once each week the milker unit should be taken completely apart and all parts put in a pan of hot water, to which has preferably been added a good dairy cleanser (never use soap powder), scrubbed inside and out with the special brushes provided with each new milker unit. If the foregoing recommendations are not in accordance with the methods recommended by your local milk inspector or board of health inspector, then it is recommended that the instructions for cleaning and sterilizing set forth by them be rigidly followed regardless of the recommendations set forth in this book.

BOILING WATER NOT INJURIOUS TO RUBBER

Boiling hot water is not injurious to rubber unless the rubber is kept in it for a period of ten or more minutes twice a day. Flushing the milker with boiling hot water takes only two or three minutes per machine. Consequently, the rubber is not subjected to the heat long enough to do any harm. The butter fat that sticks to the rubber when the machine is in use will do more harm to the rubber if not removed after each milking than excessive use of hot water.

STRAUSS ELECTRIC WATER HEATER

The proper cleaning or sterilizing of dairy utensils are chores that are frequently neglected because of the inconvenience of producing an adequate supply of hot water after each milking.

The Strauss Electric Dairy Water Heater (Fig. 28, Page 14) is now available for that purpose.

It is of the GRAVITY type. It is fitted with a cover at the top, and may be filled with a pail. The copper tank holds five gallons of water . . . which amount is sufficient for cleaning and sterilizing the milking machine equipment of the average dairy.

The heater is filled and the current is turned on when the milking is started and when the equipment is ready to be washed and sterilized, the water is boiling hot.

Teat cups are placed into the boiling water in the heater and approximately 6 quarts of this boiling hot water is drawn through each set (4) of teat cups. If the water is drawn directly from the heater through the milking machine, the greatest possible benefit is derived. If the water is first drawn from the heater into a pail, the temperature of the water will drop considerably and as a result will not be nearly as effective as boiling hot water. See Fig. 25, Page 11, for relative values of hot water for sterilizing purposes.

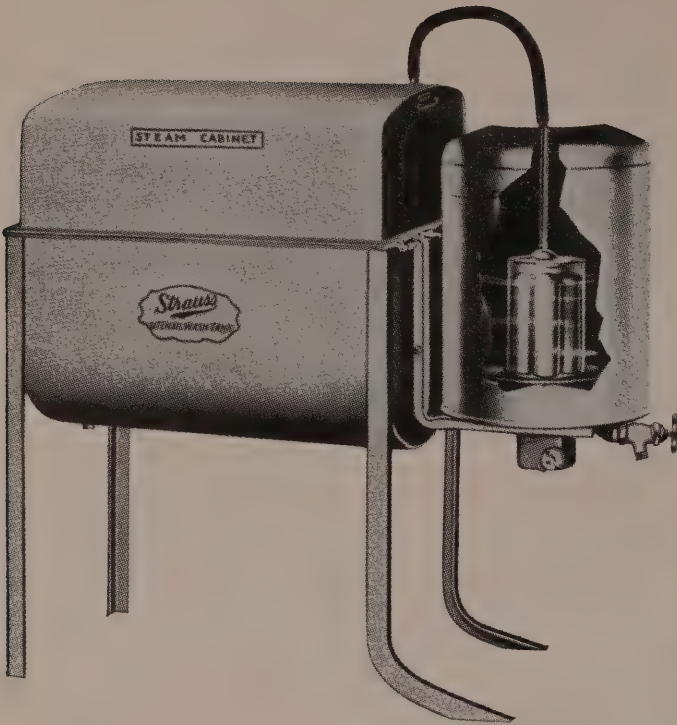


Fig. 29



Fig. 28

STRAUSS WASH TANK AND ELECTRIC STEAM STERILIZER

Fig 28 shown above is a 5 gallon capacity Strauss Electric Dairy Water Heater.

The outfit shown in Fig. 29, is a complete washing and steam sterilizing outfit, designed especially for use in the washing and sterilizing of dairy equipment. It consists of an electric water heater that will heat 5 gallons of water to the boiling point (212 degrees) in from 50 to 60 minutes—a boiler plate steel wash tank, galvanized, a steam generator for producing steam to sterilize dairy equipment, and a wash tank cover for converting the wash tank into a steam cabinet.

It operates on 220 volts, and is equipped with a thermostat to prevent overheating or burn-outs of any kind.

Full and complete detailed instructions for its operation are furnished with each outfit.

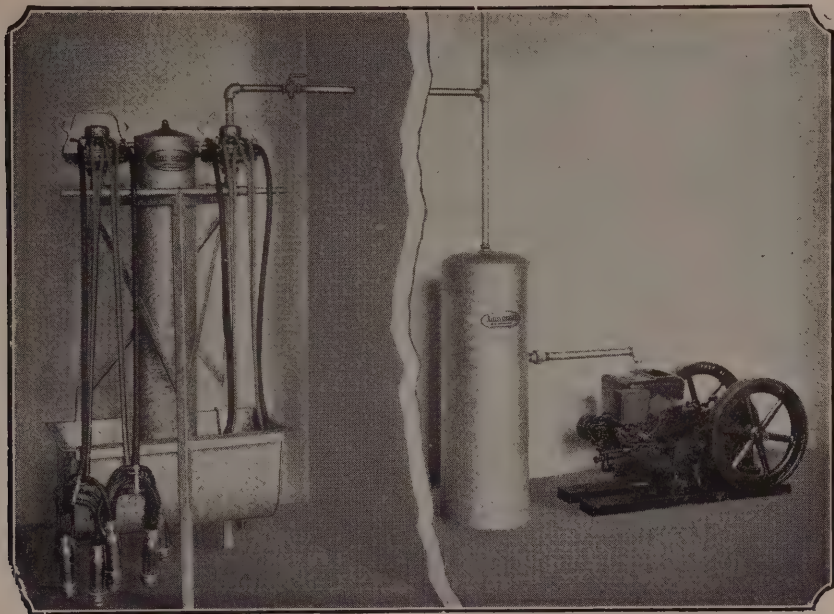


Fig. 30

UNIVERSAL WASHER-STERILIZER

No milking machine used in the production of good clean milk, milk with a low bacteria-count such as Grade "A", special baby, or certified milk, should be used for milking after it has been taken apart and cleaned by hand until it has been sterilized in BOILING hot water.

The UNIVERSAL Washer-Sterilizer both cleans and sterilizes at the same time and WITHOUT having to remove even one rubber from the milking machine. It is the only machine of its kind on the market, developed and put into practical every-day use November, 1925.

The UNIVERSAL Washer-Sterilizer is connected to the pipe line used to operate the milking machines, or may be operated from a separate vacuum pump or system. It may be located in any convenient, clean place. The lower tank is filled with water which is heated to the boiling point by steam through a pipe placed in the bottom of the tank. The pulsator and pail lid are placed on the bowl provided for it. The teat cups are placed into the lower tank. The vacuum is turned on and automatically every part of the machine that comes in contact with the milk is thoroughly washed and sterilized without a rubber being removed. By the Universal method of milking, washing, and sterilizing, milk is produced as clean and low in bacteria-count as it comes from the cow.

SOLUTION RACK

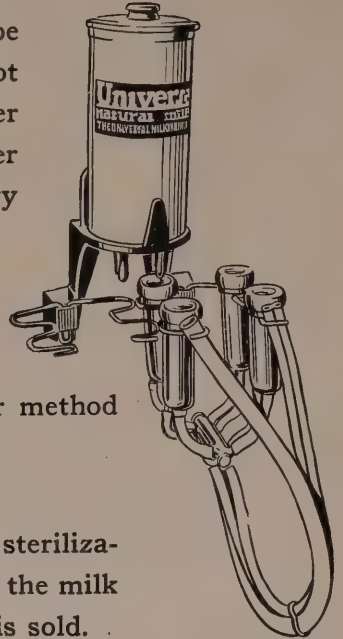
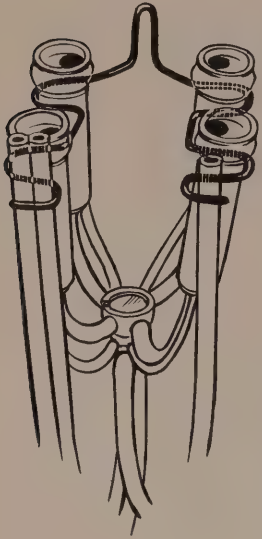
Many milk companies and boards of health require teat cups to be kept on a solution rack when not in use and the cups and rubber tubes filled with a lye or other chemical solution. A satisfactory lye solution may be prepared by following suggestions on page 30, paragraph 3.

The solution rack method is preferred in all cases to the jar method which is set forth below.

CHEMICAL STERILIZATION

Where boiling hot water is not available, chemical sterilization may be used provided it meets the approval of the milk company or creamery to whom the milk or cream is sold.

Having flushed the milker with cold water, as already recommended, (see page 11, flushing with cold water) a stone jar with a capacity of $2\frac{1}{2}$ gallons of solution for each single unit used or 5 gallons for each double unit to be sterilized should be provided, and a sterilizing solution prepared, in accordance with instructions set forth for its use by its manufacturer, after which the milker unit complete except pulsator, should be placed in this sterilizing solution and left until the next milking. In no case should the solution be used longer than one week in the winter time, and a fresh solution made at least three times a week during warm weather. Before the milker is used again, it should be flushed with a pail of clean water, boiling hot water being preferable. This removes all odors of the sterilizing solution which are harmless, but the chlorine or lye in them may give milk and cream an odd flavor, especially if it is pasteurized. Flushing with boiling hot water immediately before milking is an added precaution in that it effectively sterilizes the milker by killing any bacteria that may accumulate between the milking periods. The jar used for this purpose should be thoroughly washed, cleaned, and sterilized with boiling hot water each time a fresh solution is prepared. See also Page 30, Section 3, for the use of lye as a cleansing and sterilizing agent.





2P



2M



2002



S. M.



6P



6M



2006



Calf Nose

REPLACING 2006 CALF NOSE INFLATIONS

The calf nose inflation fits the same shell as used with the 2006 speed-master inflation and because of its superior performance will be supplied on all orders for 2006, which has been discontinued.

The calf nose inflation has three rings around the bottom where the short milk tube part is attached. When inflation is new it should be pulled through the shell past the first ring. As it wears or stretches it can be taken up by pulling through to groove number 2 and later to groove number 3.

REPLACING 6M INFLATION IN 2M SHELL

When placing the super 6M inflation in the metal shell NEVER PULL THE FLANGE ON INFLATION THROUGH THE SMALL END OF SHELL. The flange is for the purpose of preventing the inflation from being drawn too far into the shell.

REPLACING 6P INFLATION IN 2P SHELL

Insert a string (double) through the small end of the teat cup; then wrap twice around the small end of the rubber inflation, give it a twist or two (do not tie). Pull the rubber inflation into the teat cup with the string, which

will be automatically released as the rubber flange passes through the small end of the cup. Screw the bottom cap in position with fingers only before turning the large end of the inflation over the outside of the shell. **DO NOT USE WRENCH OR PLIERS**, as this may cut the inflation at the flange.

CARE OF INFLATIONS OR TEAT CUP LINERS

The inflations should be removed from the shell once a month—thoroughly brushed and washed in hot water to which a little washing powder has been added. After thoroughly washing and brushing the inflations, rinse them in boiling water. After the inflations are dry, a little mica or tire talcum, such as that used in automobile tires, rubbed on the outside surface of the inflations will be beneficial.

STRETCHING INFLATIONS

To obtain uniform milking results it is necessary to keep a slight tension in the inflation. Too much tension places an undue strain on the inflation. Take up just enough stretch to prevent the inflation buckling or bulging out of shape.

Do not use inflations that are cracked, broken, bulged, or misshaped. Equip the unit with new inflations every four to six months. The better milking results obtained will more than offset the cost.

TESTING INFLATIONS

To test for a crack, or hole in the inflation, place the teat cups in a pail of cold water and then blow through the duplex air tubes, one at a time. If there are any leaks, bubbles will be seen to rise to the surface of the water in the pail.

BRUSHING INFLATIONS

By using the crank handle teat cup brush, the inflation may be thoroughly brushed without removing from the shell. In brushing inflations without removing from the shell, care must be exercised to prevent water getting in between the inflation and shell.

LIFE OF RUBBER PARTS

The length of service the rubber goods will give before they need to be replaced depends very largely upon the care given them, therefore, no definite period of time is guaranteed. With good care, the teat cup inflation will render from four to eight months service and frequently even longer depending upon how many cows are milked at each milking with each unit. The company will replace any defective rubber goods on a basis consistent with the service rendered when the rubber goods have been returned, direct or through the dealer, to the factory for inspection. No part of the milking machine is subjected to greater wear than inflations. Therefore, they should receive the best care to assure maximum service. All rubber parts not in use should be thoroughly cleaned and kept in a cool, dry place, well protected from any light.

CAUSTIC SODA OR LYE

The outside of rubber tubes should always be thoroughly cleaned. If they have become stained the stain is easily removed by using 4 ounces of caustic soda or lye dissolved in $1\frac{1}{2}$ gallons of boiling water. Put tubes in this solution and allow to remain about 15 minutes. Then rinse tubes in clean warm water to remove caustic solution. Then use medium steel wool to clean off accumulation. Thoroughly brush, rinse and dry. This solution is very effective in removing water mineral deposits from the inside of inflations, use the same as for cleaning outsides of tubes.

Concentrated lye which is identical in action to caustic soda may be procured at most drug and grocery stores. Do not spill or splash the caustic solution on the hands as it will cause acid burns. It is best to use rubber gloves when using lye solution. **See Page 30, Section 3, for use of lye as a cleaning and sterilizing agent.**

GLYCERINE

When the tubes are thoroughly dry coat with glycerine. Dampen a clean white cloth with water. On this cloth place about one teaspoonful of glycerine. Rub this mixture into the surface of the tubes. The glycerine fills the pores of the rubber and is an aid in preventing air checking, thus adding to the life and at the same time helping to maintain a new appearance.

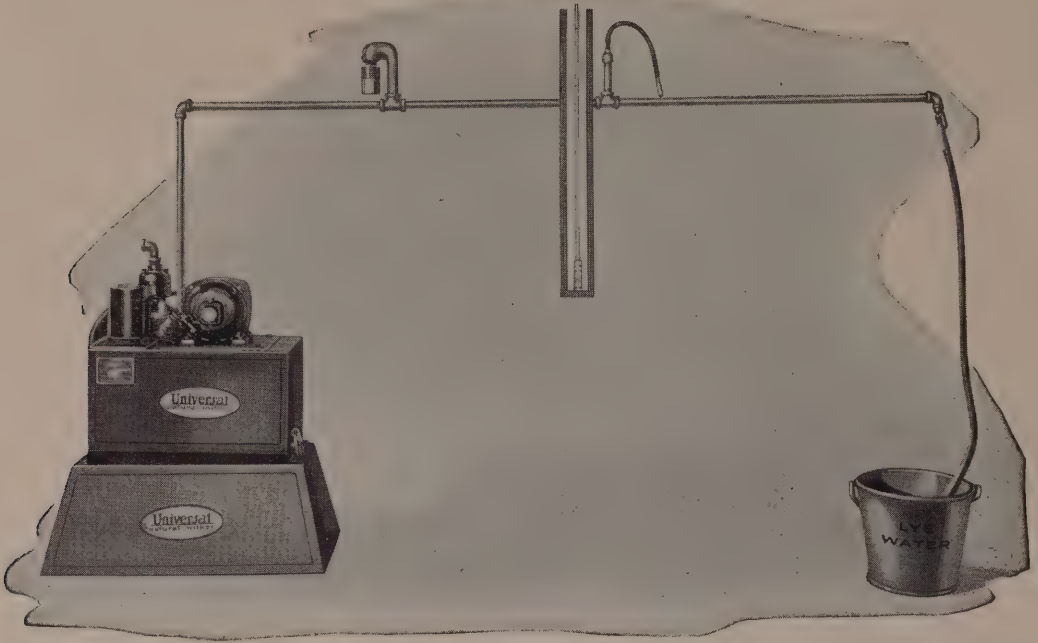


Fig. 44

CARE OF PIPE LINE

The pipe line and long vacuum hose of milker units should be flushed out every thirty days in order to remove any possible accumulation. Disconnect rubber hose from mercury gauge to prevent water getting into the gauge. Put a plug in pipe where hose was taken off to prevent any leak. See Fig. 44. Add one-half of a can of lye to 12 quarts of boiling water. Close all stall cocks. Start vacuum pump. Allow it to run until relief valve begins to take in air. Connect the long vacuum hose to stall cock the longest distance away from pump. Drop the other end of hose into the pail of hot lye water. Turn stall cock to "open" position and the water will be drawn through the pipe line into the vacuum tank. If water is not readily drawn into the line it is an indication the line probably is clogged. It is then necessary to take the pipe line apart and remove any obstruction. When all the water has been drawn into the line and with the stall cock open allow pump to run a few minutes to draw all the water into the vacuum tank. Stop pump. Drain lye water from the tank, and then draw a pail of clean fresh hot water through the line to flush out any of the lye water, which remains. Then drain tank and open all stall cocks so line will dry out.

If broken inflations are found in the milker units or if milk is accidentally drawn into the pipe line at any time the line should be flushed out with clean cold water as soon as the milking is finished.

A pipe line will never clog if it is washed regularly. A clogged pipe line is an indication of neglect. Should the milker not milk properly wash out the pipe line.

During the cold weather after the milking is finished, allow the pump to run a few moments with the last stall cock in the line open. This will dry out any moisture.

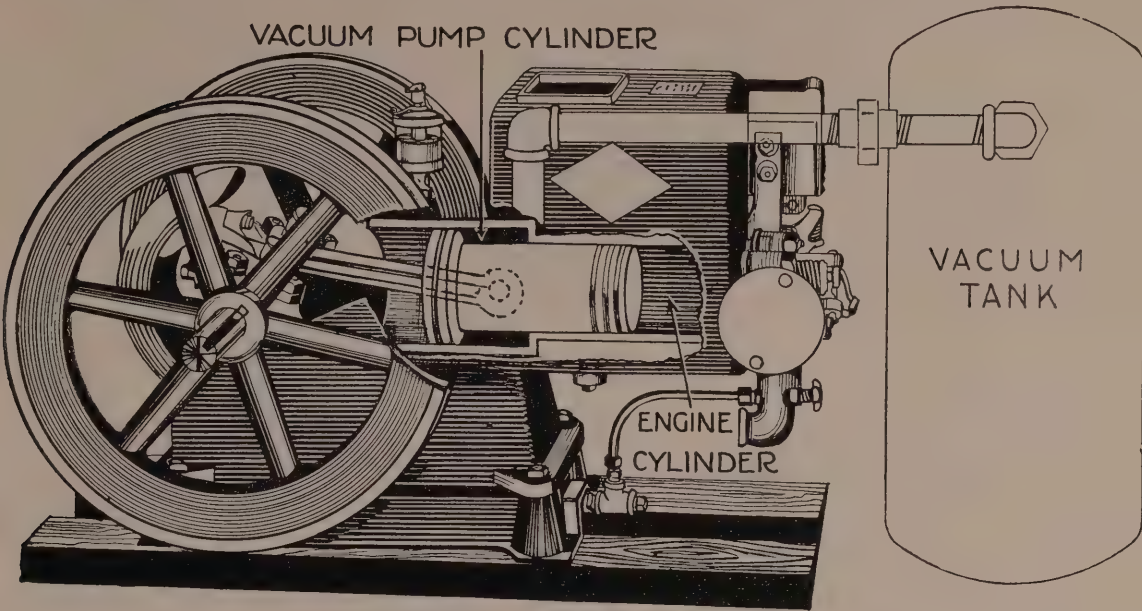


Fig. 52

THE TAYLOR VACUUM ENGINE

LOCATING ENGINE

In locating the engine in the building, the utmost care should be taken to place it where the exhaust pipes will be as short and as direct as possible. Long pipes with numerous elbows restrict the exhaust, causing back pressure and loss of power.

FOUNDATION

Place the Taylor Vacuum Engine on a solid foundation 18 inches from the floor. Cement is preferable to any other type. You will be well repaid for the extra cost of a cement foundation by the added service you will get from the engine.

LUBRICATION

Thoroughly mix from $\frac{1}{4}$ to $\frac{1}{2}$ pint of Cylinder Oil with each gallon of Gasoline used, the amount of oil required depending upon the quality used, as well as the speed of the engine and climatic conditions.

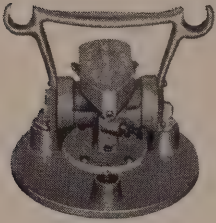
Blue smoke from the exhaust indicates too much oil. Decrease the amount mixed with the gasoline, or the amount fed through the sight glass oiler. Each time before starting engine, place a few drops of oil in the channel on top of the connecting rod. This insures Piston Pin lubrication at all times.

SPEED

Operate between 400 and 480 R.P.M.

INSTRUCTION BOOK

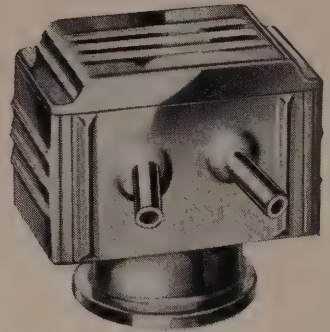
An instruction book is packed with engine. A careful study is recommended to each user that they may become thoroughly acquainted with all operations and adjustments.



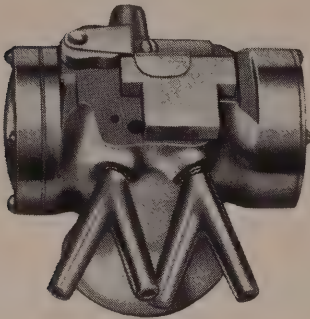
Type P



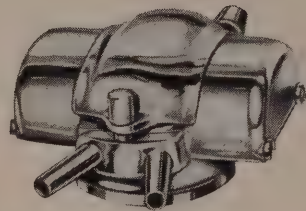
Type N



Type 7F



Type F



Type O. D.

CARE OF PULSATORS

OIL AND OILING PULSATOR

The moving parts of the pulsator should be oiled regularly once a week with penetrating oil.

If pulsator becomes sluggish in action it is due probably to gummy oil. Turn Quad-O-Matic pulsation control or regulating screw to high speed. Then with an oil can squirt a liberal supply of **PENETRATING OIL** on the moving parts to cut the gummy oil. Run at high speed for one or two minutes. Wipe off all surplus penetrating oil. Oil regularly once a week thereafter with penetrating oil.

Pulsators will be cleaned, oiled and adjusted free of any labor charge, if returned to the factory postpaid. Return postage must be paid by user.

LOAN PULSATORS

Any time a user wants to send a pulsator to the factory for cleaning and adjusting, which is done free of all labor costs, the dealer or factory will loan a pulsator to use, while the user's pulsator is being serviced at the factory. There is absolutely no charge for this loan service, except transportation charges. In requesting loan give serial number of pulsator to be repaired so the proper type or model loan can be sent for your use.

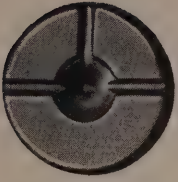


Fig. 47



Fig. 47C



Fig. 47A



Fig. 47B

CLEANING QUAD-O-MATIC

It is very seldom that the Quad-O-Matic pulsator control needs attention. Should the pulsator fail to operate when the Quad-O-Matic is turned to an indicated position it is due to the fact that that particular control port is clogged. To clean control port, remove screw holding Quad-O-Matic regulator guard. The Quad-O-Matic (Fig. 47, 47A) can then be taken out for cleaning. Use a toothpick or a match sharpened to a very fine point to clean out the holes. Be careful not to break off point in the hole. **Never** use a needle or metal pin as their use will enlarge the ports rendering the Quad-O-Matic useless. Use a brush to clean inside of Quad-O-Matic Fig. 47B.

Fig. 47C shows the new regulating spigot used on all O.D. speedmaster and short tube pulsators. It can be easily cleaned by removing and washing thoroughly in gasoline.

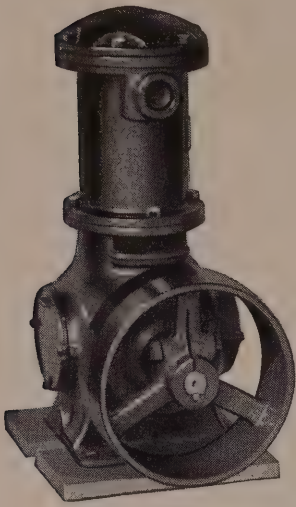


Fig. 48

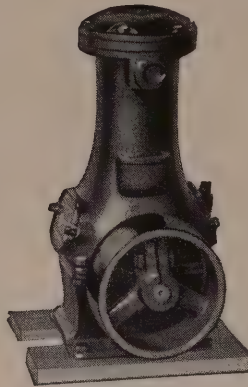


Fig. 49

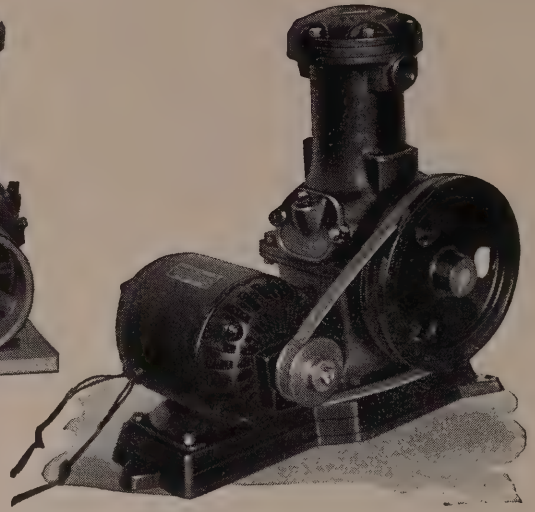


Fig. 50

VACUUM PUMPS

When installing care should be taken to see that the pump sets perfectly level and is firmly bolted to floor or solid foundation. Surroundings should be free from dirt and dust as far as possible to prevent foreign matter working into pump and preventing proper lubrication. See that all piping is carefully cut and fitted as even small leaks consume power and are therefore expensive. Suction pipe should be connected to vacuum tank with as few turns as possible. Pipes from pump to tank should never be smaller than openings in cylinder. Special care must be taken to see that all pipe used is galvanized and is free from scale, which might be drawn into pump and lodge under the valves, reducing efficiency.

In case pump seems to lose efficiency be sure there are no leaks in the piping and that speed is within the range shown on name plate. By removing screws holding down cylinder head this may be taken off together with valve plate containing the valves. Occasionally dirt or other foreign matter lodges between valves and seats, preventing them from seating properly. Clean valves and seats carefully with cloth and gasoline. Never attempt to grind valves or seats, stretch springs or change mechanism in any way. Pumps should never operate at a slower speed than minimum of 400 R.P.M. or over the maximum speed of 700 R.P.M.

LUBRICATION

Before starting pump pour oil slowly through crank case filler opening until oil cup on lower side of crank case overflows. Keep crank case filled to top of oil cup at all times. Use only the best grade of light S.A.E. 10 specification automobile oil in summer and winter. Never use steam engine, tractor oil, or oil that has been taken from the crank case of an automobile or tractor. Drain crank case every three months by removing small plug at bottom, replace plug and refill with fresh oil as above.

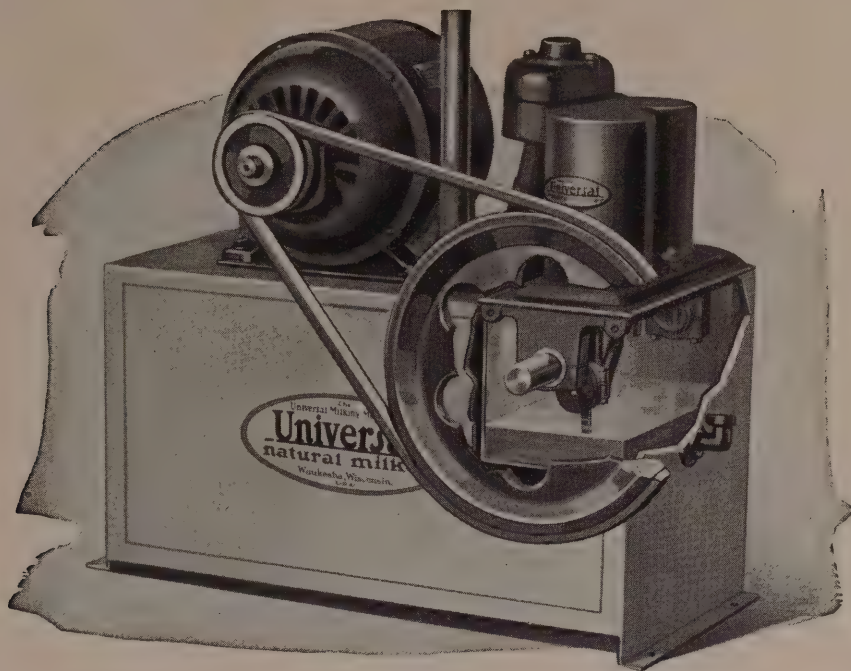


Fig. 51

LITTLE GIANT PUMPS

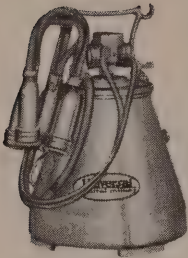
Universal Little Giant vacuum pumps are so well built and require so little attention that there is a possibility of their being neglected.

The pump is oiled by the splash system. Therefore, it is highly important that the oil level be kept up to the top of the oil gauge and that the proper grade of oil be used. During the winter months it is recommended that a high grade automobile winter oil of No. 10 S.A.E. specification is used. If possible secure an oil that will flow freely at low temperature. If temperature at location of pump falls below 30 degrees use $\frac{1}{2}$ pint of kerosene with one quart of oil. After every three months' use, drain and refill. Under no circumstances should a heavy oil be used because it will cause the pump valves to stick occasionally and may not oil the pump properly.

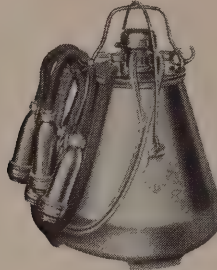
If pump is equipped with sight feed oiler the oil is kept at correct level in the pump at all times. The only attention required is to fill glass container with oil when it shows empty or nearly so.

Failure of the pump to create sufficient vacuum is usually due to the oil gumming up the valves, or dirt getting under a valve and holding it open. To clean the valves remove cover over valves or pump head. The valves and valve seats can then be taken out and washed in gasoline. When all parts are thoroughly cleaned reassemble. If this fails to remedy the trouble look for a leak in the milker unit or pipe line. Should the pump develop a knock or lose speed examine belt pulley to see that it is tight on the shaft. The noise may also be due to a loose or worn bearing. All bearings are equipped with laminated shims to provide take-up for wear. There are two laminated and two solid shims in each bearing. The V-belt should always be a trifle loose, just so it does not slip.

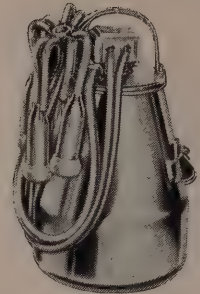
MILKER UNITS



Type P



Type N



Type 7F

All Universal Pail Type Milker Units are made in both double and single units to suit the individual purchaser. Double units may be converted to single units by removing one teat cup assembly, long milk tube and duplex air tube.

To convert a single unit to a double unit, the regular 40 or 50 pound capacity pail which is standard equipment with all single units, should be replaced with a 70-pound capacity pail. The relief tubes, in pulsator should be replaced with the proper parts, and a complete teat cup (4) assembly added with long milk tube and duplex air tubes.

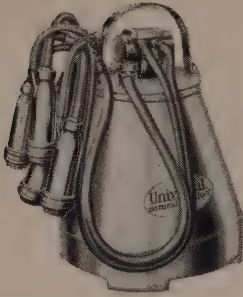
PAIL HANDLE LOCKING DEVICE

The pulsator and pail lid when placed on the pail may be held in place by the vacuum alone. No locking device is needed to hold it when there is a vacuum in the pail, but for convenience in carrying when there is no vacuum in the pail, the arched handle of the pail may be locked into position over the pulsator handle, thus locking the pulsator on the pail. For illustration, see above.

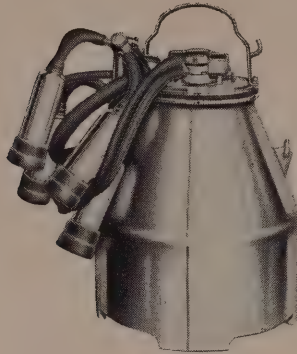
MILKER PAIL

The UNIVERSAL milker pail should be washed in the usual manner of washing any other milking utensil with first cold and then boiling hot water after which it should be placed in a good clean place to dry.

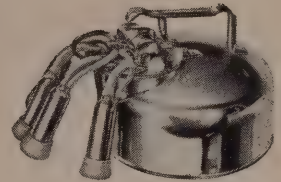
MILKER UNITS



Type F



Speedmaster



Short Tube

The foregoing instructions covers in general the operation of all milker units. Where specific detailed instructions are desired these are covered by special supplementary instruction sheets or cards packed with each milker unit and cover the following models P—N—F—7F—OD—SM—Short tube and portable units. In requesting special instructions to cover your milker always give the number on the pulsator. This will indicate the model you have and enable us to send you exactly what is wanted.

The Universal is so designed and constructed that the machine may be most effectively cleaned and sterilized daily without having to remove even one rubber. A score of certified dairies and hundreds of producers of Grade "A" and special milk are using the UNIVERSAL NATURAL MILKER and they unqualifiedly endorse the method of cleaning and sterilizing, outlined in pages 28 to 31 inclusive of this book.

If these instructions are followed each time the milker is used, milk will be produced by UNIVERSAL milking as clean and free from bacteria as the cow produces it.

UDDER TROUBLES

Cows have always had udder troubles of an inflammative nature such as garget, mammitis, etc. In the past when these troubles developed, especially during the hand milking period, they were usually ascribed to "unknown causes".

During the early day of the milking machine dairymen were not very well informed on the subject of udder troubles. They were likely to blame the milking machine, in spite of the fact that previous to the advent of the machine udder troubles existed and their own herds had suffered. This of course was unfair to the milking machine.

Today it is a well known fact that udder troubles can be traced almost directly to overfeeding, mouldy food, decayed food, impure water, congestion caused by lying on cold cement floors or ground, and others. The reason all these things cause udder trouble is the udder is a very delicate organism easily affected by any abnormal condition of the cow's system. This is especially true of the average high producing cow.

The UNIVERSAL NATURAL MILKER does not cause udder troubles when operated with low vacuum it milks exactly as the calf does—applying just enough vacuum to get the milk.

In the event of the development of udder trouble which cannot be traced, do not blame the milker. Immediately isolate affected cow from the herd. Call a veterinarian to diagnose the trouble and prescribe treatment. If the milker is used on a diseased cow it may carry the germs to a healthy cow, but it cannot originate the germ.

PRODUCING GRADE A MILK

City Boards of Health and milk dealers are continually demanding milk of better quality. Many cities have ordinances prohibiting the selling of milk with a bacteria count above a certain limit. This has created a demand for milk usually known as Grade A.

The easiest and most profitable way to produce Grade "A" milk is through the use of UNIVERSAL NATURAL MILKERS. Due to their use the milk remains free from barn odors, sediment and contaminations unpreventable in hand milking and which usually result in high bacteria counts.

Washing and sterilizing UNIVERSAL NATURAL MILKERS, as outlined on Pages 11 to 16 inclusive of this manual, result in all parts of the machine which come in contact with the milk being sterile. The UNIVERSAL NATURAL MILKER can be relied upon to produce Grade "A" milk at all times if these simple washing and sterilizing instructions are followed.

PRODUCING CERTIFIED MILK

Certified milk must have a bacteria count of less than 10,000 per cubic centimeter. This is the cleanest and highest quality milk on the market. It is produced under the rules and supervision of the American Association of Medical Milk Commission, Inc. The production of certified milk requires that the cows be in perfect health and the elimination of every possible source of contamination.

Many of the foremost certified dairies of the United States are using UNIVERSAL NATURAL MILKERS to produce certified milk at the lowest possible cost.

In the production of certified milk it is especially recommended that the UNIVERSAL Washer-Sterilizer be used, see Page 15. With this machine the milking machines are washed and sterilized without being taken apart after each milking. This eliminates man-handling the parts after they have been sterilized, thereby preventing their being contaminated while being reassembled. Descriptive literature of the Universal Washer-Sterilizer will be supplied upon request.

IMPORTANT SUGGESTIONS

1. The lower the vacuum the easier it is on the cow. 10 to 12 inches produces excellent milking results with the UNIVERSAL.
2. Milking a stream or two by hand before applying the teat cups breaks Nature's seal and assures the end of the teat being open. This milk is full of bacteria and should not be used.
3. Allowing the machine to remain on the cows too long may result in their becoming slow milkers (dribblers). Milking out the last few streams by hand saves time.
4. Each and every time it is used and immediately after the last cow is milked, the milker must be flushed first with cold water then with boiling hot water.
5. If a pail overflows, wash out the pipe line immediately after milking.
6. Satisfactory results cannot be obtained by using old worn-out, leaky rubber which has outlived its usefulness and efficiency. The cost of replacing rubber goods is more than offset by the quicker milking and better results.
7. A milking machine cannot create disease germs and should not be blamed for garget or udder diseases. These diseases are usually caused by infection or contact with other infected animals.
8. The UNIVERSAL NATURAL MILKER was built to work and will work if properly cared for and operated according to printed instructions. If for some unknown reason, yours fails to operate successfully, call on your local dealer or write the factory for advice and assistance.

SUGGESTED MILKING METHODS FOR CLEANER AND BETTER MILK

1. Cow's udders and teats should be thoroughly cleaned by washing with a good chlorine disinfectant.

Milk direct from a normal cow is clean and low in bacteria count and can be kept so until delivered to the distributor or milk plant, if a few simple rules are followed. Before milking is started all dirt on the udder or teats should be removed. This can be done by washing them with water (luke warm is preferred) to which has been added a good disinfectant solution. Use sterilized washing and drying cloths. The disinfectant kills bacteria, thus rendering the teats and udders clean and free from harmful bacteria that might otherwise contaminate the milk, causing high counts.

2. Forestrip each cow in special "Strip-Cup" provided especially for that purpose.

More bacteria is usually contained in the milk in the end of the cow's teats before the milking is started than in all the rest of the milk in the cow's udder, therefore, it is advisable to take two or three squirts from each teat (whether the milking is done by hand or machine) into what is termed a "Strip-Cup". A strip-cup may be any ordinary tin cup having a capacity of from one to two pints.

The top of this cup is covered with a fine wire screen or cloth. (Black is recommended in preference to any other color.)

The Third advantage offered by forestripping is—it prepares the cow to give down to the milking machine, resulting in a quicker and more complete response. The use of a strip-cup and the practice of forestripping at each milking period is most important and will do more to help in the control of bacteria counts than any other one thing.

3. Immediately after milking, flush with cold water, clean properly, then sterilize with boiling hot water.

The machine should then be thoroughly cleaned in water to which has been added a good cleaning powder or compound. A very effective solution may be made by dissolving three 13 oz. cans of concentrated lye in one gallon of water, add two ounces (liquid measure) of this solution to each one gallon of water used for washing. Use earthen jar or galvanized iron pail for container for making solution. After it has cooled it should be kept in a glass jug. It is a legal requirement in most States to label solutions of this kind "poison". It is recommended that the label be taken from the can containing the lye and pasted on the jug containing the solution to meet this requirement. Reassemble the milker and flush one gallon of **BOILING HOT WATER** through each single unit milker, two gallons through each double unit.

Boiling hot water will dissolve and carry out any trace of remaining butter fat and at the same time thoroughly sterilize the milker by in-

stantly killing all harmful bacteria. Hot water will not be the most effective unless it is **BOILING HOT**, (212° Fahrenheit.) If water with lower temperature is used a greater quantity would be required. If 180° water is used, it would require just seven times as much, or seven gallons per single unit and fourteen gallons for each double unit.

4. Milking machines should be kept in good sanitary conditions between milkings.

After the milking machine has been cleaned and sterilized, care should be taken to keep it clean and sterile until ready for use again. There are several methods being used that are maintaining uniformly good results.

One popular practice is to place the teat cups on a sterilizing rack and keep cups and rubber milk tubes filled with a lye solution. This solution should be prepared the same as recommended in Section 3 above for washing.

This solution acts as a further cleansing and sterilizing agent. The use of this solution is recommended by many agricultural colleges, experiment stations and milk distributing companies.

When lye solution is used, the milker should be thoroughly flushed by sucking at least a pail of clean cold water through each milker unit just before it is used for milking again. This removes any trace of the solution left in the tubes that might otherwise get into the milk.

5. Cool milk and keep temperature under 50° until delivered to the buyer.

After milk with a low bacteria count has been produced and placed in a can, or other container, it must be kept below a temperature of 50° until it is delivered to the buyer. Bacteria start to multiply at a temperature of 56°. At a temperature of 98°, bacteria doubles in count every 20 minutes. Thus milk with a count of 3,000 would at the end of one hour have a count of 24,000, and at the end of two hours 192,000. When the temperature is 50° or less, there is practically no increase in bacteria count.

6. Clean and Sterilize all Utensils.

In addition to the milking machine all other milk utensils, such as, pails, cans, strainers, coolers, washing and drying cloths, should be washed each time they are used and then completely sterilized with boiling hot water or some other sterilizing agent recommended by the local milk inspector.

7. Effect of Lye on Metal and Rubber.

Lye solution ($\frac{1}{2}$ of 1 per cent) as recommended above, will have no injurious effect on rubber or metals used in milking machines, except aluminum. If the solution comes in contact with aluminum, it will cause it to become very dark and pitted. Do not use lye solution in aluminum pails or containers.

DEALER AND FACTORY SERVICE

If at any time your milker or any part of it doesn't work properly read this instruction book carefully, make thorough examination of all parts, then if you are unable to get proper results, see your dealer or write the factory, giving full particulars of your trouble. Every Universal Natural Milker will work just as efficiently five or ten years after it is installed as it did when first used. If you are unable at any time to get such results, remember the dealer from whom you purchased it and the company who manufactured it are ready and willing to help you locate your trouble and overcome it. Do not hesitate to call for help when you need it. This is part of "Universal" service.

As soon as your milker is installed and working, you should notify the company that you are a Universal user, giving full name with postoffice address. (See page 4—Free cleaning rod.) This applies in all cases, whether you have purchased a new machine or a used outfit from some other user or dealer.

Every user whose name we have on file will receive at least one service letter annually; often two or three are sent out. Whenever a new machine is produced or a better way of operating your present one is found, each user is at once notified. This service is free to all Universal users, but we cannot send it to you unless your name and address is on record.

The dealer from whom you purchased your outfit is supposed to report every new user but oftentimes this is forgotten and your name never reaches us, therefore, we suggest that you write us direct and thus insure your name being registered. Send us this information just as soon as you receive your milker. See Page 4—FREE CLEANING ROD.

THE UNIVERSAL MILKING MACHINE CO.

Factory & General Offices

WAUKESHA, WIS.

Branch Distributing and Service Agencies

Eastern Factory Branch
125 South Franklin St.
SYRACUSE, N. Y.

Canadian Branch
165 King Street
PETERBORO, ONT.

Pacific Coast Branch
726 Harrison Street
SAN FRANCISCO, CALIF.

